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TO THE CONGRESS OF THE UNITED STATES

St. Louis Exp. '04
Coll. by R.L. Humphrey
Jan. 05

Memorial

PRESENTED BY THE TRUSTEES OF THE SANITARY DISTRICT OF CHICAGO, FAVORING THE CONSTRUCTION BY THE GOVERNMENT OF THE UNITED STATES OF A DEEP WATERWAY FROM LAKE MICHIGAN VIA THE CHICAGO SANITARY AND SHIP CANAL AND THE DESPLAINES, ILLINOIS AND MISSISSIPPI RIVERS TO ST. LOUIS

ISSUED MARCH, 1900
REISSUED NOVEMBER, 1902
REVISED AND REISSUED, AUGUST, 1904

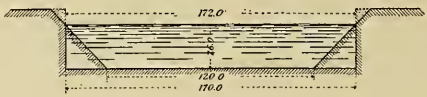
MEMORIAL

Presented by the Trustees of the Sanitary District of Chicago to the Congress of the United States

DEEP WATERWAY FROM LAKE MICHIGAN TO THE MISSISSIPPI RIVER AT ST. LOUIS

CHICAGO SANITARY AND SHIP CANAL.

MANCHESTER



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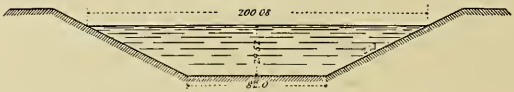
- BALTIC -

NORTH SEA
- AMSTERDAM -



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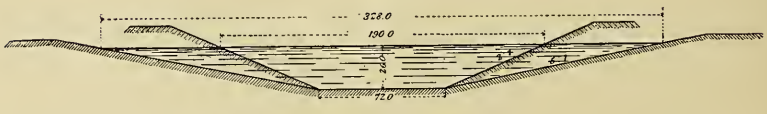

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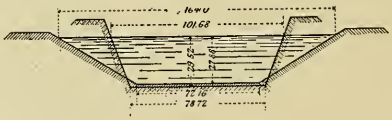

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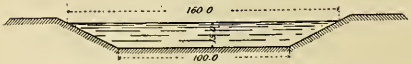

ILLINOIS & MISSISSIPPI
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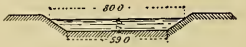

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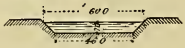
ILLINOIS & MICHIGAN



CROSS-SECTIONS OF NOTED CHANNELS.

MEMORIAL

PRESENTED by the Trustees of the Sanitary District of Chicago, favoring the construction by the Government of the United States of a Deep Waterway from Lake Michigan, via the Chicago Sanitary and Ship Canal and the Desplaines, Illinois and Mississippi Rivers, to St. Louis.

I.—INTRODUCTION.

To the Congress of the United States:

Your Memorialists, WILLIAM H. BAKER, JOSEPH C. BRADEN, ZINA R. CARTER, FRANK X. CLOIDT, ALEXANDER J. JONES, WILLIAM LEGNER, THOMAS A. SMYTH, THOMAS J. WEBB and FRANK WENTER, the members of the board of trustees of the Sanitary District of Chicago, address you to urge that in the exercise of your powers over the rivers and harbors of the land, you may take early steps leading toward the construction of a deep waterway from Lake Michigan through the valley of the Illinois River and the Mississippi River to St. Louis. The commercial need is great, and the resulting benefits are sure to be immense; while a simple and easy method is available for the work, free from the uncertainties and unknown factors that so often hamper engineering operations.

The appropriation of $200,000 by the first session of the fifty-seventh Congress, for the expenses of the survey of the route and for the preparation of plans and estimates, is a great forward step already taken by your honorable body; but it is only a step, and pending the termination of the survey, your memorialists beg to offer you the information in their possession which goes to prove the importance and feasibility of the route.

The construction of such a canal is not a local, but a national work. It means the establishment of an institution under Government control which will furnish new and important means of communication in the central west. It offers a passageway for light draught war vessels through the heart of the continent, independent of any unfriendly nation in time of war. On the purely commercial side it can rightly be maintained that were only the commercial interests of Chicago and St. Louis, and the towns and farms between, to be considered, the building of the canal would be fully justified. But there is vastly more than this

at issue. All of the business interests of the Great Lakes, with their trade in coal and iron, lumber, grain and manufactured goods, lie waiting for the opportunity to extend their navigation southward through the Mississippi valley into the rich prairies of the central part of the continent. Nor is even this extension of navigation all that the proposed deep waterway will accomplish. The ports of the Gulf of Mexico, and many of the ports of South America, would be opened to direct navigation with Chicago and Duluth and Buffalo. And when the time arrives for the opening of the Isthmian Canal, now asured to the nation, the still wider commercial reaches of the Orient would be attained. These things may seem at first thought like ideals of a far distant future; in reality they are ideals of the immediate present, which can be realized by a work that is in comparison but a trifle. Hardly elsewhere can an enterprise be found from which such great results can be attained for such small expenditures.

It is not an inland canal of the olden type which your memorialists propose to you, but rather one the like of which has never been produced, save in connecting great bodies of water with one another across narrow strips of land. It is a true deep waterway that is sought. The exact depth that would be most advisable is for your special board of engineers, to whom is intrusted the survey, to recommend. A depth of fourteen feet is sugested by your memorialists, because the state of Illinois has committed itself by repeated joint resolutions of its General Assembly by the encouragement of such a waterway, because the preliminary estimates indicate that the work of construction for that depth can be economically carried out, because the supply of water necessary to it is already in existence, and because a similar depth can be counted on the greater part of the year in the Mississippi River beyond St. Louis, the outlet of the canal. A depth of ten or twelve feet would be but a starting point. A depth of twenty feet is ultimately to be desired, but it would be comparatively useless until great engineering works have been accomplished in the improvement of the lower Mississippi.

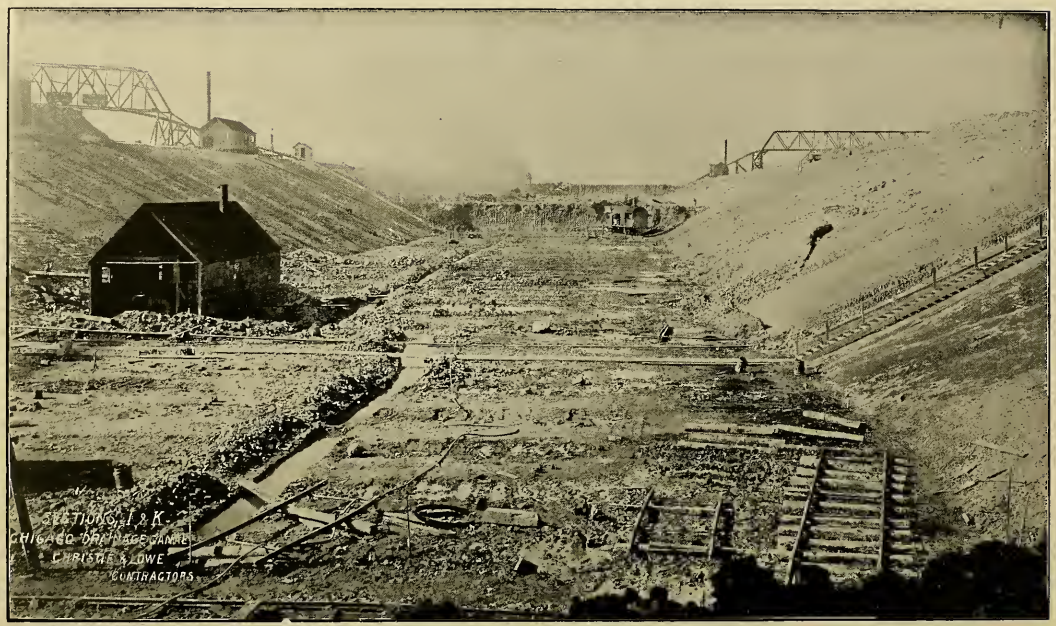
That a deep waterway from Lake Michigan to the Mississippi River is a work of easy accomplishment, is due beyond anything else to the existence of the Chicago Sanitary and Ship Canal, which has been constructed by the people of Chicago under the direction of your memorialists and their predecessors, the Trustees of the Sanitary District of Chicago. The route for the waterway follows the course of the Chicago River, the natural flow of which is toward Lake Michigan, and the Desplaines and Illinois Rivers flowing toward the Mississippi. The Chicago Sanitary and Ship Canal has pierced the watershed dividing the headwaters of the Chicago from the headwaters of the Desplaines; it has caused the natural current of the Chicago River to be reversed, and a great flood of a possible 600,000 cubic feet a minute to be started from the lake toward the gulf, and it has provided a channel adequate to accommodate vessels of twenty feet draught. To the extent to which it reaches the Sanitary and Ship Canal is all that can be desired for the purposes of deep water navigation. Even beyond its own limits

it is a powerful aid to the deep waterway project, for it furnishes sufficient water to give a steady supply to a fourteen-foot channel to the Mississippi.

The piercing of the divide between the lake and the gulf watersheds is by far the most difficult and costly portion of the work of building the deep waterway. The people of Chicago have expended already almost $43,000,000 in accomplishing it. When they have finished all related works they will have spent $55,000,000. The plans and estimates which your memorialists will present to you in detail in this memorial show that the expense for the entire remainder of the work will not exceed $27,000,000, little over half of what Chicago alone will have spent. Chicago's contribution to the proposed waterway, measured in dollars, is therefore more than two-thirds of the entire work.

From the very inception of their canal, intended primarily for sanitation, the people of Chicago have had in mind its ultimate use as a deep waterway. The very name given by law to the canal characterizes its double purpose. Had it been built solely for sanitation, it would have cost less by $18,000,000 than it did. The additional $18,000,000 measures the sacrifice the people of Chicago have made to secure the deep waterway navigation of the future. State laws already exist, by the operation of which the federal government will receive full authority over the canal for purposes of navigation as soon as the deep waterway shall have been built. The balance of the work properly belongs to the federal government, without whose aid it will, indeed, never be accomplished.

In requesting your early consideration and favorable action upon this great project of internal improvement, your memorialists speak with the full conviction that they have behind them the unanimous approval of the 2,000,000 inhabitants of the Sanitary District of Chicago, whom they represent. Though they may not speak authoritatively for the residents of the valley of the Illinois, they know of the existence of a similar sentiment along the entire course of the proposed deep waterway. Pending your final decision they suggest that all work upon the federal improvement of the shallow canals of the region, and upon related improvements of the Illinois River, be suspended. They are not, however, committed to any one method of work, nor to any specified plans or provisions. They hold only to the need of the work, under the conviction of its practicability, and they feel assured that in the wisdom of Congress its accomplishment will be secure. They offer to you freely and gladly their services in whatever way they may be of assistance, and they will co-operate with any association or organization now existing or hereafter to be formed to that end.



CHARACTERISTIC EARTH CUT.

II.—THE ROUTE OF THE PROPOSED DEEP WATERWAY—ITS NATURAL ADVANTAGES.

Lake Michigan and the Mississippi River may seem at first sight to be members of two entirely distinct drainage systems, sharply separated from each other by nature; but such is not the case. Though the surplus waters of Lake Michigan flow through the more easterly lakes and down the St. Lawrence to the North Atlantic, while the waters of the Mississippi flow southward into the Gulf of Mexico, there is, nevertheless, a point where the two drainage systems come close together, where the rocky barrier surrounding the shores of the Great Lakes dwindles down to a height of but a few feet, and where there takes its origin a channel provided by nature, down which may flow the waters of Lake Michigan to the Mississippi River and the Gulf of Mexico. This point of slight and frail barriers is at the City of Chicago, which indeed owes its very existence where it is to the physical characteristics of the region. The channel through which the waters may flow is the valley of the Desplaines and Illinois Rivers, in which, as your memorialists hope, a deep waterway of the greatest commercial value will soon be constructed.

Many thousands of years ago the Great Lakes formed an arm of the sea, but with the progressive changes in the elevation of the rocks they were left in a depression, from which their waters flowed through two outlets. One of these was from Lake Ontario, as at present, and the other was from Lake Michigan, southward through the valley of the Illinois and the Mississippi to the Gulf. This latter outlet followed what had in the ice age been the course of the great southward moving glaciers. The pounding of the ice had cut through the low hills of rock and opened a channel, that in the later days, when the water used it, was 200 feet deep, two miles wide and about twenty miles long. The bed of this ancient outlet can still be traced at an elevation of only seven feet above the present surface of the lake, and thirty feet above the level of Niagara outlet at Horseshoe reef, opposite Buffalo. There were swift rapids for a number of miles at the end of this channel in the rock, and beyond it, in the softer rock, the water hollowed out a great pool, where now is Lake Joliet. As it passed to the south the torrent of water from Lake Michigan broadened out into a great river many miles wide in the prairie lands below.

The level of the water in the lake was many feet higher then than it is now, but as time went on the water subsided, while the rocks near Chicago became slightly elevated. The waters did not cut deep enough in the rock, however, to

keep the channel open, and this southern outlet from the lakes gradually closed. A watershed was then formed between the slope of the land that drained into Lake Michigan and the slope that furnished tributaries to the diminished stream of the Illinois valley. This divide never reached a height of more than a few feet above lake level, however, and thus it remains to-day, or rather did remain until it was cut through in recent years by the Chicago Sanitary and Ship Canal.

When the first explorers came to the country they found only a narrow bar of land, composed mostly of glacial drift, separating the lake from the headwaters of the Desplaines, which is a tributary of the Illinois, with such a continuous flow into it as to be practically the upper section of the same river. Joliet anchored his boat at a point on the shore of the lake, near to the present town of Summit, eleven miles inland from the present shore at Chicago. He was confronted only with the difficulties of a short portage before continuing his voyage toward the Gulf. So plain was the relation between lake and river in those days that Joliet, in describing it, could not help even then holding forth upon the possibilities of a connecting canal. In a letter to his friend, Father Dablon, dated August 1, 1674, he said:

"A very important advantage, and one which some, perhaps, will find it hard to credit, is that we could quite easily go to Florida in boats, and by a very good navigation. There would be but one canal to make—by cutting only one-half a league of prairie—to pass from the Lake of Illinois (Lake Michigan) into the St. Louis River (the Desplaines River). The route to be taken is this: The bark should be built on Lake Erie, which is near Lake Ontario. It could easily pass from Lake Erie to Lake Huron, from which it would enter the Lake of Illinois. At the extremity of this lake would be the cut or canal of which I have spoken, to have a passage to the St. Louis River, which empties into the Mississippi. The bark having entered this river, could easily sail to the Gulf of Mexico."

As the years went on deposits were made on the shore, and the land encroached on the water to the extent of about ten miles in a century and a half. In the flat shore lands, the short Chicago River formed, draining the eastern slope of the divide. Still even in the early part of the last century the conditions were such that the sources of the Chicago and the Desplaines Rivers were for the greater part of the year in a common pool of water, which disappeared, leaving the two streams entirely separate, only in very dry seasons. The physical characteristics of the region in 1817 were described by Samuel A. Storrow, judge advocate of the United States Army, in a letter to Major General Brown, as follows:

"Before the Chicago River enters Lake Michigan its branches unite, the one proceeding from the north, the other from the southwest, where it takes its rise from the very fountain of the Plein (Desplaines), or Illinois, which flows in an opposite direction. The source of these two rivers illustrates the geographical phenomenon of a reservoir on the very summit of a dividing ridge. In the autumn they are both without any apparent fountain, but are formed within a mile and a half of each other by some imperceptible undulations of the prairie, which drain

it and lead it in different directions. In the spring the space between the two is a single sheet of water, the common reservoir of both, in the center of which there is no current toward either of the opposite streams. This circumstance creates the singular fact of the insulation of all of the United States except Louisiana, making the circumnavigation of them practicable from the Gulf of St. Lawrence to that of Mexico, with the single hindrance of the Falls of Niagara. The situation of the Chicago and De Plein Rivers should not escape national attention. The ground between the two is without rocks, and with little labor would admit of a permanent connection between the waters of the Illinois and Lake Michigan."

The drainage of the land and progressive improvements consequent upon settlements have altered these conditions so that the separation between the two water systems seems now more complete, but as a matter of fact, the barrier between them is, as has been said, but a trifle.

The statement is often made of the Chicago Sanitary and Ship Canal—and a similar statement will doubtless be made of the proposed waterway—that it is a reversal of natural conditions, but it is plain enough from what has been said, that such is not the case. The canals will rather restore conditions as they were thousands of years ago—and indeed they will at the same time anticipate conditions which must inevitably come again, for geologists say that, as the natural result of geological processes now going forward, the southern outlet to Lake Michigan will open again in about 2,500 years.

That the route is as simple as it is natural is equally evident. The only radical part—the cutting through of the divide—has already been accomplished. For the rest there is but the dredging and widening of the channels of the Desplaines and Illinois Rivers. Though there is some rock cutting to be done, the problem is not one of opening a new channel, but of improving a channel already in existence. Through the Mississippi River toward the Gulf the route of the waterway is equally plain.

Of the natural conditions of the route but one further point needs mention. It is the effect of the opening of such a channel upon the level of the waters of Lake Michigan. Objections on this score do not carry any weight. Engineers estimate that ten times the amount of water which will flow through the present Sanitary and Ship Canal when used to its full capacity, can be carried off from Lake Michigan without having any injurious effect upon the electric power now developed at Niagara Falls, providing only that the water supply of the lake region is properly conserved, as it may easily be. Full navigation for ocean going vessels of large size could be established the whole distance to the Gulf without drawing anywhere nearly to this extent upon the lake waters.

CHARACTERISTIC ROCK CUT.

III.—THE DEEP WATERWAY POLICY OF THE STATE OF ILLINOIS: WITH A HISTORICAL SKETCH OF CANAL BUILDING BETWEEN LAKE MICHIGAN AND THE MISSISSIPPI RIVER.

The policy of the State of Illinois has always been favorable to the establishment of communication by water between Lake Michigan and the Mississippi River, and indeed, long before the state came into existence the predictions of explorers and the desires of early settlers looked in the same direction. The state gave most sincere proof of the earnestness of its policy three-quarters of a century ago in the days of the tow-path and the canal boat, by the construction of the old fashioned Illinois and Michigan Canal connecting Chicago with the Illinois River, and later by securing from Congress the construction of the Hennepin Canal connecting the upper Illinois with the upper Mississippi. In these modern days of deep waterways and steam navigation it has given a similar proof that its desires have kept pace with commercial development by the provisions made when the construction of the Sanitary and Ship Canal was authorized by law, that the channel should be ample for the needs of a deep waterway, and that the control of the channel for purposes of navigation should be transferred to the federal government as soon as the deep waterway came into existence.

Before detailing to your honorable body the actions of the state directed toward this end your memorialists wish to point out to you, by the words of our forefathers themselves, the interest that the project claimed from the earliest days. It is indeed impossible to go so far back in the history of white men in the west as to get beyond this interest. Joliet's views have already been quoted, and from his day on, a long line of navigators, explorers, engineers, scientists and statesmen have advocated just this project. In the early years of last century, when the territory of Illinois was being rapidly settled the demand for water communication with Lake Michigan was so strong that canal building was probably the greatest question of public policy that agitated the minds of the settlers. They carried their demands to the Federal Congress, seeking aid for the work, which was far beyond their young powers. The speeches in Congress upon the project caused newspaper and magazine discussions all over the east, and the following paragraph from an editorial in *Niles' Register,* August 6, 1814, published in Baltimore, shows to what a pitch the feeling had been aroused:

"By the Illinois River it is probable that Buffalo may be united with New Orleans by inland navigation through Lakes Erie, Huron and Michigan, to the

Illinois River, and down that river to the Mississippi. What a route! How stupendous the idea! How dwindles the importance of all the artificial canals of Europe compared with this water communication!"

In those days there was no permanent settlement at the mouth of the Chicago River, where Chicago now stands, and the few residents of the neighborhood were too insignificant to take into consideration. It was not for their benefit, but for the welfare of the farmers and town dwellers in the interior of the state, as well as indirectly for the welfare of the manufacturers and merchants of the east, that the canal was desired. Possibly, indeed, there was greater interest shown at St. Louis, across the Mississippi, than at any other point, and the orators and editors of that city never tired of expatiating upon the benefits that would follow the work. The *Inquirer*, a St. Louis paper of the time, expressed the sentiment of the people in this way:

"The communication between the lake and the Illinois is a point which will fix the attention of the merchant and the statesman. They will see in it the gate which is to open the northern seas into the valley of the Mississippi, and which is to connect New York and New Orleans by a water line which the combined navies of the world cannot cut off. Never did the work of nature require so little aid from the hand of art to complete so great a design."

These often and earnestly voiced demands could not fail to have results; and in 1816 the first practical step toward the construction of a canal between Lake Michigan and the Illinois River was taken when a treaty was negotiated with the Ottawa, Chippewa and Pottawattamie Indians, by which they ceded to the United States a strip of land about twenty miles wide, extending through the Desplaines and Illinois valleys from Chicago to Ottawa. Two years later preliminary surveys were begun by two parties of surveyors, sent out by the state, one party beginning ten miles north and the other ten miles south of Chicago.

Efforts had been made in Congress, beginning immediately after the Indian cession, to secure action helping the territory to obtain the canal, and it is interesting to note that a New England man was at the time the strongest friend the project found. December 11, 1817, John Holmes, member of congress from Massachusetts, introduced into the House of Representatives a resolution instructing the committee on so much of the President's message as related to roads and canals, to inquire into the expediency of providing by law to construct a navigable canal to unite the waters of Lake Michigan with the Mississippi. The resolution was carried, but the committee made no report. Illinois became a state in the following year, its boundaries being extended far enough north to include Chicago and the mouth of the proposed waterway.

While the feasibility of opening such a waterway was universally acknowledged at this time, the man to whom most credit is due for the taking of definite steps toward it was Daniel P. Cook, a son-in-law of Governor Ninian Edwards. Cook was the second representative of Illinois in Congress, serving from 1819 to 1827. It was largely through his influence that the state legislature in 1821 caused

a partial survey of the entire route to be made for the purpose of demonstrating the practicability of the undertaking. Finally, just in the last days of the last session of Congress during his membership a bill was passed granting to the state 200,000 acres of the public lands, to be disposed of for the benefit of the work of construction.

Illinois provided by statute for the construction of the canal in 1829, but the work was not begun until 1836, and it was not declared complete until 1848, and even then all that had originally been contemplated had not been accomplished. Agitation for extension and improvement soon began and was kept up until in 1867 the state and federal governments joined for the work, which was finally carried as far as La Salle, giving the canal a total length from the Chicago River of ninety-six miles, with a depth of six feet. Great as the blessing of the canal was in its early days, it lost much of its importance with the building of railroads, and for many years it has been insignificant as an aid to commerce. Its rise and decline are shown in the figures of its tolls and tonnage. The tolls, which amounted to $87,890 in 1848, reached their high mark at $300,810 in 1865, and steadily declined to $20,866 in 1900. The greatest number of boats that used the canal was in 1866, when 230 were registered. The greatest tonnage was in 1882, the figure being 1,011,287. In 1900 but sixty boats made use of the canal, and the total tonnage was only 121,759.

In addition to the Illinois and Michigan Canal there is still another canal which makes use of the water from the Illinois River. This is the Illinois and Mississippi Canal, usually known as the Hennepin Canal, from Hennepin, nineteen miles below Utica, to the Mississippi River at Rock Island. Congress authorized the surveys leading to its construction in 1882. Its depth is only seven feet, and no proper provision has ever been made for giving it an outlet to Lake Michigan. Consequently no great commercial advantage has ever flowed from it. Government dredging operations and dam building on the Illinois River have heretofore all been in accordance with the commercial possibilities of these two canals, and consequently entirely inadequate to the needs of modern commerce.

Although for several years no forward steps toward deep waterway communications were taken, public opinion was only resting and awaiting its opportunity. The time came in the end of the eighties when the City of Chicago, searching for a sewage system which would permit the maintenance of a pure lake water supply, decided that it must use the Desplaines and Illinois Rivers for its sewage outlet. The project brought again to the fore the possibility of a deep waterway to the Mississippi River to replace the obsolete Illinois and Michigan Canal. By keeping both problems, sanitation and deep waterway, in close connection with each other, the people of Chicago had no difficulty in securing from the State Legislature in 1889 the authority to establish a sanitary district, and through it to construct a sanitary and ship canal. If the proposition had not been presented as one which would make the channel deep and broad enough to float the largest lake craft then sailing between Buffalo and Duluth and Chicago there might have been much greater opposition. But this plan, helping to realize the ancient dreams of

the state, and so evidently of great commercial value to all the interior cities, as well as to Chicago, appealed to every one. The state laws accordingly provided explicitly that the water supply should be as great as a deep waterway would need, that the channel should be made and kept navigable, and that ultimately the Federal Government could assume control of it for purposes of navigation. These provisions are all found in the following extracts from the Sanitary District Act:

"SECTION 23. If any channel is constructed under the provisions hereof, by means of which any of the waters of Lake Michigan shall be caused to pass into the Desplaines or Illinois Rivers, such channel shall be constructed of sufficient size and capacity to produce and maintain at all times a continuous flow of not less than 300,000 cubic feet of water per minute, and to be of a depth of not less than fourteen feet, and a current not exceeding three miles per hour, and if any portion of any such channel shall be cut through a territory with a rocky stratum where such rocky stratum is above a grade sufficient to produce a depth of water from Lake Michigan of not less than eighteen feet, such portion of said channel shall have double the flowing capacity above provided for, and a width of not less than 160 feet at the bottom, capable of producing a depth of not less than eighteen feet of water. If the population of the district draining into such channel shall at any time exceed 1,500,000, such channel shall be made and kept of such size and in such condition that it will produce and maintain at all times a continuous flow of not less than 20,000 cubic feet of water per minute for each 100,000 of the population of such district, at a current of not more than three miles per hour, and if at any time the general government shall improve the Desplaines or Illinois Rivers so that the same shall be capable of receiving a flow of 600,000 cubic feet of water per minute, or more, from said channel, and shall provide for the payment of all damages which any extra flow above 300,000 cubic feet of water per minute from such channel may cause to private property, so as to save harmless the said district from all liability therefrom, then such Sanitary District shall, within one year thereafter, enlarge the entire channel leading into said Desplaines or Illinois Rivers from said district to a sufficient size and capacity to produce and maintain a continuous flow throughout the same of not less than 600,000 cubic feet of water per minute, with a current of not more than three miles per hour; and such channel shall be constructed upon such grade as to be capable of producing a depth of water not less than eighteen feet throughout said channel, and shall have a width of not less than 160 feet at the bottom; in case a channel is constructed in the Desplaines River, as contemplated in this section, it shall be carried down the slope between Lockport and Joliet to the pool, commonly known as the upper basin, of sufficient width and depth to carry off the water the channel shall bring down from above. The district constructing a channel to carry water from Lake Michigan of any amount authorized by this act, may correct, modify and remove obstructions in the Desplaines and Illinois Rivers whenever it shall be necessary so to do to prevent overflow or damage along said river, and shall remove the dams at Henry and Copperas Creek in the Illinois River, before any water shall be turned into the said channel. Commissioners, if they shall find at

any time that an additional supply of water has been added to either of said rivers, by any drainage district or districts, to maintain a depth of not less than six feet from any dam owned by the state, to and into the first lock of the Illinois and Michigan Canal at La Salle, without the aid of any such dam, at low water, then it shall be the duty of said canal commissioners to cause such dam or dams to be removed. This act shall not be construed to authorize the injury or destruction of existing water power rights.

"SECTION 24. When such channel shall be completed, and the water turned therein to the amount of 300,000 cubic feet of water per minute, the same is hereby declared a navigable stream, and whenever the general government shall improve the Desplaines and Illinois Rivers for navigation, to connect with this channel, said general government shall have full control over the same for navigation purposes, but not to interfere with its control for sanitary or drainage purposes."

In 1897 the General Assembly of the state adopted a series of joint resolutions explicitly favoring a fourteen-foot channel to the Mississippi, and asking the Federal Government to co-operate in creating it: Omitting unessential portions of the preambles, the resolutions were as follows:

I.

"*Resolved by the Senate, the House of Representatives Concurring Therein:*

"1. That it is the policy of the State of Illinois to procure the construction of a waterway of the greatest practicable depth and usefulness for navigation from Lake Michigan via the Desplaines and Illinois Rivers to the Mississippi River, and to encourage the construction of feeders thereto of like proportions and usefulness.

"2. That the United States is hereby requested to stop work upon the locks and dams at La Grange and Kampsville, and to apply all funds available and future appropriations to the improvement of the channel from La Salle to the mouth, with a view to such a depth as will be of present utility, and in such manner as to develop progressively all the depth practicable by the aid of a large water supply from Lake Michigan at Chicago.

"3. That the United States is requested to aid in the construction of a channel not less than 160 feet wide and twenty-two feet deep, with such a grade as to give a velocity of three miles per hour from Lake Michigan at Chicago to Lake Joliet, a pool of the Desplaines River immediately below Joliet, and to project a channel of similar capacity and not less than fourteen feet deep, from Lake Joliet to La Salle, all to be designed in such manner as to permit future development to a greater capacity.

II.

"WHEREAS, The construction of the sanitary canal of Chicago, and the large volume of water required to flow through the same, will bring lake and river navigation, which are now 320 miles apart, within sixty miles of each other, and

the development of the intermediate section between Lockport and Utica will furnish a through route from the Great Lakes to the lower Mississippi by way of the lower Illinois River, and to the upper Mississippi by way of the Hennepin Canal; and, further, that the proportion of three routes constructed by the Sanitary District of Chicago will exceed the cost of extending the largest useful navigation by way of the Illinois River to the lower Mississippi, together with that of the Hennepin canal to the upper Mississippi; and

"WHEREAS, We believe the making of a deep waterway of the Illinois River to be an undertaking which is national in its character and should be accomplished by the general government for the general welfare, the inland and maritime commerce of the nation, and for the nation's defense in time of war; therefore be it

Resolved, by the Senate, the House of Representatives Concurring Therein:

"1. That it is the policy of the State of Illinois to procure the construction of a waterway of the greatest practicable depth and usefulness for navigation from Lake Michigan by way of the Desplaines and Illinois Rivers to the lower Mississippi River, and by way of the Hennepin Canal to the upper Mississippi River, and to encourage the construction of useful feeders thereto.

"2. That the locks and dams on the Illinois River at La Grange and at Kampsville are detrimental to the sanitary and agricultural welfare of the Illinois valley, and form no part of a proper development in the interest of navigation, and should be removed whenever the supply of water, as required by law, is turned into said river by means of the sanitary canal of Chicago, and said district has removed the dams at Henry and Copperas Creek; and the United States is hereby respectfully requested to remove the said dams and to enter upon the improvement of the alluvial portion of the Illinois River by means of a system of channel improvements, so as to fully utilize the flow of water from Lake Michigan.

"3. That the rock bound section of the Desplaines and Illinois Rivers form (from) the end of the sanitary canal of Chicago at Lockport to the head of the alluvial river at Utica, should be developed for a navigable depth of not less than fourteen feet, and that the United States is requested to enter upon this work in co-operation with all lawful agencies provided for in this state and in harmony with the policy herein set forth.

"4. That we demand the immediate removal of all dams constructed by the government across the Illinois River, whether the channel of the river is deepened or not, and our Senators and Representatives in the United States Congress are hereby earnestly requested to use their influence in favor of the removal of such dams at the earliest practical moment."

Adopted by the Senate May 27, 1897.

Concurred in by the House of Representatives, 1897.

IV.—THE CHICAGO SANITARY AND SHIP CANAL.

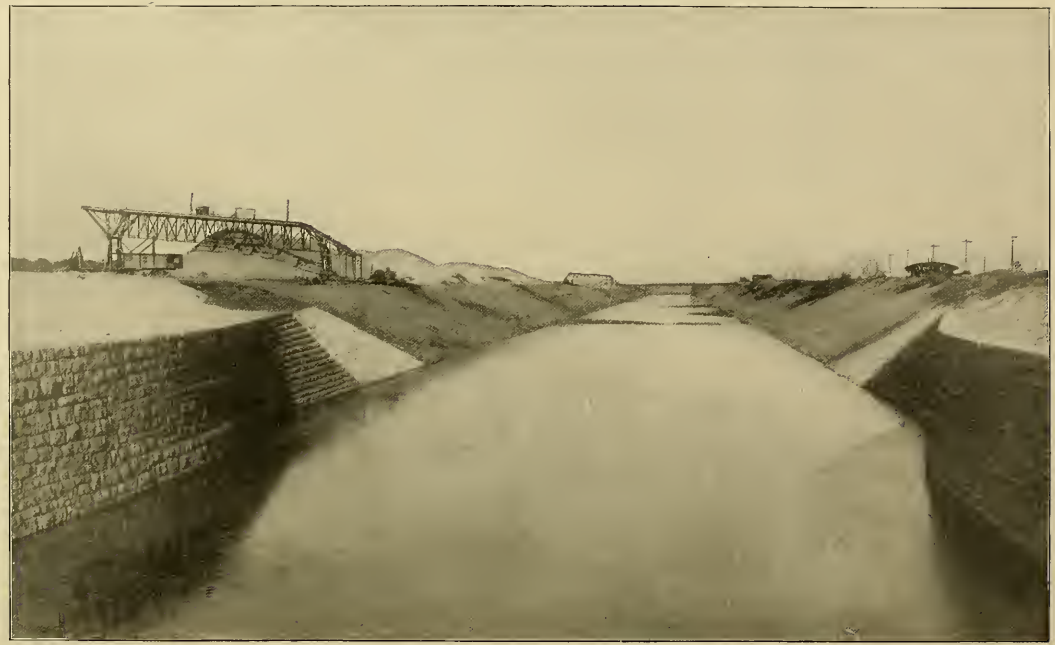
The Chicago Sanitary and Ship Canal may well be called the greatest artificial waterway ever constructed, and in its character of a navigable channel it stands ready to hand for the benefit of the Federal Government as a complete and in every respect satisfactory section of a deep waterway from Lake Michigan to the Mississippi River. It is indeed, because of this character of the Sanitary and Ship Canal, and because it was designed for such ultimate use, that your memorialists, who have had its construction in their charge, are able to address you as parties deeply interested in the development of the waterway.

Before describing the inception and construction of the canal in detail it is well to point out again the place it fills in the general plan. It cuts through the divide between the Chicago River and the headwaters of the Desplaines, which is by far the most difficult and expensive portion of the entire work of construction. Its cost, when completed, will be close to $55,000,000.00, more than double the amount which will be necessary, as figures to be presented later will show, for the entire remainder of the work. It carries a volume of water large enough to furnish a steady supply for a waterway fourteen feet deep, from its commencement at Chicago to the Mississippi River at St. Louis. To give it this capacity at least $18,000,000 more was spent upon it than would have been necessary to meet the demands of its use for sanitation alone.

The Chicago Sanitary and Ship Canal was, as has been said, primarily constructed for the disposal of the sewage of the City of Chicago, which had previously passed into Lake Michigan, polluting the water supply of the city. Notwithstanding this use of the canal, it is not to be thought that it is an unpleasant stream. So great is the volume of water provided, that the canal is clear and odorless, and in fact in better condition hygienically than the ordinary river flowing through an inhabited country.

The construction of the canal was authorized by state law May 29, 1889, and the Sanitary District of Chicago was organized for the work, its territory including all that part of Chicago lying north of Eighty-seventh street, with the exception of two small outlying suburbs, and forty-three square miles of Cook County outside of the city limits. Its total area is 185 square miles. The district is eighteen miles long from north to south, and nine and a half miles wide on a line east and west through the city hall. Its extreme width is fifteen miles.* The nine trustees to whom the control of the district was given, were authorized to levy taxes to the

*By an act of the Legislature of the State of Illinois in the year 1903, 78.6 square miles of territory to the north were added to the corporate limits of the original Sanitary District and 94.5 square miles to the south. The present total area is now 358.1 square miles and 38 miles long from north to south.



JUNCTION OF EARTH AND ROCK SECTIONS AT WILLOW SPRINGS, ILLINOIS.

extent of one-half of one per cent per annum on the assessed valuation of the property of the District; and for the five years from 1895 to 1899 they were allowed a tax rate of one and one-half per cent. They were also empowered to issue bonds to the amount of five per cent of the taxable property of the district, with the provision that that amount should not exceed $15,000,000, a limitation which in 1901 was raised to $20,000,000, to enable further improvement of the Chicago River. The total bond issue to date has been $24,790,000, of which amount $17,565,000 is still outstanding. The total income of the District from taxes to date has been $27,950,766.38.

The first Board of Trustees of the District, elected December 12, 1889, consisted of John J. Altpeter, Arnold P. Gilmore, Christoph Hotz, John A. King, Murry Nelson, Richard Prendergast, William H. Russell, Frank Wenter and Henry J. Willing. Trustees Hotz, King, Nelson and Willing resigned early in their terms, however, and in their places William Boldenweck, Lyman E. Cooley, Bernard A. Eckhart and Thomas Kelly were elected.

The second Board of Trustees, elected November 5, 1895, included Trustees Boldenweck, Eckhart, Kelly and Wenter, of the former board, and the following new members: Joseph C. Braden, Zina R. Carter, Alexander J. Jones, James P. Mallette and Thomas A. Smyth.

November 6, 1900, the present Board of Trustees was elected, Trustees Braden, Carter, Jones, Smyth and Wenter being returned, and William H. Baker, Frank X. Cloidt, William Legner and Thomas J. Webb taking the places of retired members.

The Presidents of the Board have been:

MURRY NELSON,	February 1, 1890, to December 2, 1890
RICHARD PRENDERGAST,	December 2, 1890, to December 8, 1891
FRANK WENTER,	December 8, 1891, to December 3, 1895
BERNARD A. ECKHART,	December 3, 1895, to December 8, 1896
THOMAS KELLY,	December 8, 1896, to December 7, 1897
WILLIAM BOLDENWECK,	December 7, 1897, to December 4, 1900
ALEXANDER J. JONES,	December 4, 1900, to December 3, 1901
THOMAS A. SMYTH,	December 3, 1901, to December 8, 1903
ZINA R. CARTER,	December 8, 1903

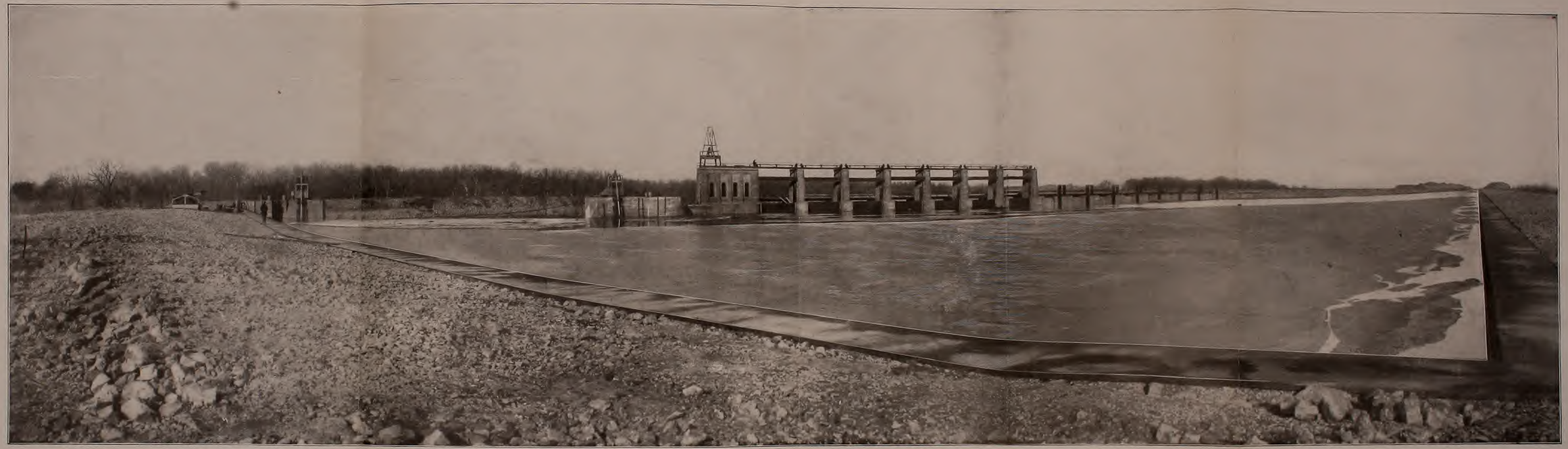
Ground was broken for the work of excavation September 3, 1892, Trustee Wenter, then President of the Board, throwing the first shovelful of earth. From that time forward the work was pushed in the face of every obstacle, and at times with a rapidity hitherto unknown in channel digging, as for example when in a single month, August, 1894, 1,291,688 cubic yards of glacial drift, and 413,164 yards of solid rock were excavated. Many new methods were introduced for the gigantic task, and schemes of a boldness fitting the great enterprise were adopted. Finally, after more than seven years of work, the canal and enough of the coordinated works were finished to make it possible to begin to put it to use. January 2, 1900, the water of the Chicago River was turned into the channel, and

fifteen days later the gates at the lower end were opened and for the first time in centuries the water of the lake began to flow toward the Gulf of Mexico.

The canal proper is, as now being extended, thirty-two and three-tenths miles long, but in addition six miles of the Chicago River, and two and one-fourth miles of the Desplaines River have been improved by the District, so that the stretch of water over which control has been formally assumed in accordance with the law is forty and fifty-five one hundredths miles long. The Chicago River has become an uninterrupted part of the channel, with even better navigable depth than the canal proper, while the Desplaines has only been improved sufficiently to answer the sanitary purposes of the canal.

The Chicago River, prior to the opening of the canal, was a short and deep stream, branching to the north and to the south a mile back from the lake. With little fall, and small sources of supply excepting the water poured into it from many sewers, it was almost stagnant. As its dock lines had never been carefully preserved, its banks were irregular, the bed varying greatly in width at different places. The problem which the Sanitary District had to face was the enlarging of this river so that it would provide a sufficient volume of water for the needs of the canal without producing a current injurious to navigation. This was accomplished in the first instance by dredging to a depth of twenty feet (except over tunnels), and by the construction of two by-passes or conduits, with dimensions of 16x50 feet, on the west side of the river from Monroe to Van Buren Streets, where the channel was narrowest. Several of the most obstructive center-pier bridges were also removed.

Later on, however, after the water was turned into the canal in 1900, a systematic study of river improvement to meet the needs of navigation was made, and the District by ordinance adopted a policy which provided for the widening of the river to 200 feet, and its deepening to twenty-six feet, through the entire length used in securing water supply. At the same time a depth of thirty feet was indicated as ultimately desirable. Under the ordinance condemnation proceedings have been begun for all the necessary land which could not be secured by purchase, and dredging, piling and docking have been going on simultaneously at many points. At the same time plans have been made to remove all of the center-pier bridges in the river, and substitute bascule bridges for them. Some of these bridges are already finished, others in process of construction, and the remainder will be contracted for as rapidly as is possible without interfering too seriously with traffic on the streets. The estimate for the total cost of this work is $9,000,000. At this writing, June, 1904, about forty-two per cent of it has been finished. The completion of this work is dependent upon the rapidity with which the courts will handle the necessary condemnation suits. With all of the property in the possession of the District, the construction work could be completed in two years. With the completion of the work under these plans, the Chicago River will be a perfect navigable stream, of a uniform depth of twenty-six feet, saving only for the presence of three street railway tunnels, the removal of



CONTROLLING WORKS AT LOCKPORT, ILLINOIS

which is certain to come in the near future, but must await the action of either the City of Chicago or the Federal Government.

The Sanitary and Ship Canal proper begins at the west fork of the south branch of the Chicago River at Robey Street, and extends 28.05 miles to Lockport. The depth of water in it varies with the flow, but the construction is such that under no conditions will the minimum be less than twenty-two feet. The present depth is between twenty-four and twenty-five feet. The channel is cut part of the way through glacial drift and part of the way through rock.

From Robey Street to Summit, a distance of nearly eight miles, the channel is 110 feet wide at the bottom, and 198 feet wide at the water line. This part of the channel is cut through soil which permits easy dredging while the channel is in use, and for this reason it was not given its full capacity at the start, but left for enlargement as needs require. From Summit to Willow Springs, something over five miles farther, the channel is cut through earth with much hard material mixed in it, and it has the full planned dimensions, being 202 feet wide at the bottom and 290 feet at the water line. From Willow Springs to Lockport, fifteen miles, the channel is through rock, and is 160 feet wide at the bottom and 162 feet at the water line. The average depth of the trough cut through the rock in this section is thirty-five feet. The grade of the channel is one and five-eighths inches to the mile through the earth sections, and three and one-quarter inches to the mile through the rock section. The bottom of the channel at Robey Street is 24.448 feet below Chicago datum, the datum being reckoned from low water in Lake Michigan in 1847. At Lockport the bottom of the channel is 30.1 feet below datum.

At Lockport there is in the canal a large windage basin, cut in the stone to enable large vessels to turn around. Here also are the controlling works, by means of which the flow of water in the canal is governed. These works consist of seven sluice gates of metal with masonry bulkheads, and one bear trap dam. The sluice gates have a vertical play of twenty feet and openings of thirty feet each. The bear trap dam has an opening of 160 feet and an oscillation of seventeen feet vertically. This dam is essentially two great metal leaves, hinged together and working between masonry bulkheads. The down-stream leaf is securely hinged to a heavy foundation, and the raising or lowering of the dam is accomplished by the admission or discharge of water through regulating valves. The dam is regarded as one of the greatest engineering triumphs of the age.

From Lockport to the southern limits of Joliet, six and one-half miles, the work of the Sanitary District consisted in the deepening, widening and leveling of the Desplaines River, so that it will accommodate a flow of 1,500,000 cubic feet of water a minute. This capacity provides both for the flow from the sanitary canal, and for all possible flood waters of the Desplaines valley. No attempt was made in this part of the work to establish the navigable depth, which was one of the primary considerations in the plans from Chicago to Lockport.

There is now, however, under construction by the Sanitary District on this section a work of water power development which, when it is completed, will

afford a twenty-two-foot channel for 3.3 miles and a ten-foot channel for one mile, the two covering over half of the entire distance. This water power, created by the heavy declivity of fifty-two feet in eight miles on this section, is exceedingly valuable, the gross tolls possible from it being estimated on different methods of development at from $628,150 to $1,086,300 a year. The cost of the development will be $3,000,000. Besides the power now being developed below Lockport the District will, as soon as it can acquire the necessary property, develop a second power near the southerly limits of the City of Joliet. This second power will afford about 18,000 net horse power with the full flow of the channel. This is called the Hickory Creek development, and the building of the dam necessary for its accomplishment will afford nearly a mile of waterway about thirteen feet in depth.

The flow of water which the canal is designed to accommodate is 600,000 cubic feet per minute. In its present condition the canal will not, however, admit this volume in all parts without producing a current harmful to navigation. The narrow section of the canal between Robey Street and Summit will carry only 300,000 cubic feet at a current of a mile and a quarter an hour. The Chicago River will, as yet, handle little over 300,000 cubic feet; but a flow of 480,000 cubic feet will be possible when the work now under way is finished, while an additional volume of 120,000 cubic feet will be supplied through a large conduit to the lake along Thirty-ninth Street. The actual flow of water in the Chicago River is regulated in accordance with the orders of the Secretary of War. At present the flow permitted is 250,000 cubic feet per minute. With the progress of improvements in the river the increase of the permissible flow is to be expected.

The building of the canal involved the construction or alteration of many bridges, and in this, as in every part of the work, the needs of navigation were always kept in mind. The bridges are all either of the swing or rolling lift type, and the District boasts some of the largest lift bridges ever constructed. One of the railway bridges has space for eight tracks. Thirty-seven bridges have already been built or contracted for, and there are many more to be placed across the Chicago River. The following table shows their distribution on different parts of the channel:

BRIDGES ACROSS THE CHICAGO SANITARY AND SHIP CANAL.

	Highway.	Railroad.
Chicago River	9	1
Main Channel	6	7
Desplaines River	2	4
Controlling Works	1	..
Joliet Project	5	2
Total	23	14

The distribution of the construction expenditures is shown in the following table:

STATEMENT OF EXPENDITURES, ACCOUNT CONSTRUCTION OF MAIN CHANNEL OF SANITARY DISTRICT OF CHICAGO AND AUXILIARY WORK TO JUNE 1, 1904.

	Excavation, etc.	Bridges.
Main Channel Excavation, etc	$18,499,136.15	.....
Bridge Construction, Main Channel	.....	$1,975,114.73
Chicago River Dredging, Docking, etc	1,744,514.71	.....
Bridge Construction, Chicago River	.....	1,944,629.02
River Diversion, Excavation, etc	1,000,186.38	.....
Bridge Construction, River Division	.....	142,391.94
Controlling Works at Lockport	330,560.73	.....
Bridge Construction, Controlling Works	.....	7,873.35
Joliet Project Excavation, etc	1,285,760.98	.....
Bridge Construction, Joliet Project	.....	271,161.66
Illinois & Michigan Canal Improvement near Bridgeport	77,016.08	.....
Water Power Development	71,191.17	.....
Thirty-ninth Street Pumping Plant	45,990.00	.....
Totals	$23,054,356.20	$4,341,170.70
		23,054,356.20
		$27,395,526.90

Of the total cost $18,000,000 at least would have been saved had the channel been made merely sufficient for the needs of sanitation, and not built with a view to the creation in the future of a deep waterway. The additional cost in the one matter of bridges alone, to make them all movable, so that they would not hinder navigation, was close to $2,500,000.

To make the immensity of the work done by the Sanitary District all the clearer the following table of the quantities involved in the construction work, completed and under contract, as taken from the 1903 report of the chief engineer, is presented:

QUANTITIES INVOLVED IN THE CONSTRUCTION OF THE CHICAGO SANITARY AND SHIP CANAL.

	Earth, Cubic Yards.	Rock, Cubic Yards.	Masonry, Cubic Yards.	Metal in Bridges, Pounds.
Chicago River	3,209,946	4,473	59,695	21,091,490
Main Channel	26,692,773	12,265,442	421,965	22,862,454
Desplaines River Diversion	1,810,652	258,659	1,447	2,006,785
Controlling Works	.....	10,111	11,454	109,161
Joliet Project	593,130	598,483	22,911	3,956,654
Water Power Development	105,000	1,273,689	144,504	.....
Totals	32,411,501	14,410,857	661,976	50,006,524

FINISHED ROCK SECTION AT LEMONT, ILLINOIS.

V.—DESCRIPTION AND ESTIMATES OF THE PROJECTED DEEP WATERWAY.

Having described the Chicago Sanitary and Ship Canal as a complete section of a deep waterway to the Mississippi, and having shown that from it the full flow of water necessary to the waterway can be secured, your memorialists wish to point out one further fact in connection with it before proceeding to discuss in detail the projected improvement of the route. This is, that the Sanitary and Ship Canal is itself a most powerful engineering aid to the further work which must be undertaken. Considered as a mere instrument for the scouring of the bed of the Illinois River, the flow of water from the sanitary canal is worth millions of dollars, because it will save millions that would otherwise have to be spent. In broad rivers, such as is the Illinois for the greater part of its course, there is a tendency to alluvial deposits, and a large volume of water scours the channel and keeps it clear. The water from the sanitary canal thus becomes a force so powerful that engineers will take it into account from the very beginning of their reckonings. The full flow of 600,000 cubic feet of water per minute, possible in the Sanitary and Ship Canal, is one-half the volume in the Mississippi River at Rock Island during the low water season. Its discharge into the Mississippi from the mouth of the Illinois at Grafton will therefore materially increase the volume of the Father of Waters for a great part of the year. It follows that, even below Grafton, in the Mississippi, itself, the water from the Sanitary and Ship Canal will be an important aid in the engineering operations necessary for thee stablishment of permanent deep water navigation.

From Lake Michigan at Chicago to St. Louis, following the water route, is 362 miles. Of this distance the Sanitary and Ship Canal has already fully developed thirty-four miles. There is 289 miles of the Desplaines and Illinois Rivers to be improved, and the Mississippi River section covers thirty-nine miles.

When the deep waterway survey which your honorable body has authorized is completed, you will be in possession of full information as to the work which must be done, and the expenses which must be incurred. Pending that time, it is nevertheless possible, as a result of preliminary surveys and estimates made on behalf of this Sanitary District and of other organizations interested in the establishment of a deep waterway, to give figures and estimates that are close to the truth.

These estimates are made on the basis of a twenty-two-foot channel from Chicago to Lake Joliet, and a fourteen-foot channel from that point to the mouth

of the Illinois. The fourteen-foot figure is chosen because it is that depth for which the Sanitary and Ship Canal provides the necessary flow of water. An estimate of the cost of establishing a fourteen-foot channel from the mouth of the Illinois to St. Louis is also given, though it does not pretend to the same accuracy as the other estimates.

The characteristics of the river valley from the lower end of the Sanitary and Ship Canal to the Mississippi are of such nature that the distance can well be divided into three sections, requiring different methods of development, and varying greatly in probable expense. The following table shows the main facts for these sections, as well as for the Sanitary and Ship Canal and for the Mississippi River as far as St. Louis.

SECTIONS OF THE PROPOSED WATERWAY.	Length, Miles.	Declivity, Feet.	Minimum Depth, Feet.	Number of Levels.	Cost to January 1, 1904.
CHICAGO RIVER AND CHICAGO SANITARY AND SHIP CANAL.					
Chicago to Lockport	34	24	22	1	$42,503,168 80
	Length, Miles.	**Declivity, Feet.**	**Proposed Depth, Feet.**	**Number of Levels.**	**Estimated Cost.**
DESPLAINES AND ILLINOIS RIVERS.					
Lockport to Lake Joliet	8	52	22	2	*$ 5,000,000 00
Lake Joliet to Utica	54	66	14	3	10,000,000 00
Utica to mouth of Illinois	227	32	14	1	7,000,000 00
MISSISSIPPI RIVER.					
Mouth of Illinois to St. Louis	39	21	14	2	5,000,000 00
Totals for sections dependent on government action	328	171	.....	8	$27,000,000 00

*Exclusive of the $3,000,000 which the Sanitary District is about to spend on this section.

A discussion of the work still remaining to be done in order to secure such a deep waterway will now be given.

THE JOLIET SECTION—LOCKPORT TO LAKE JOLIET.

A depth of twenty-two feet, rather than of fourteen feet, is dictated on the Lockport-Lake Joliet section of the proposed waterway, partly because the water-power development plans of the Sanitary District will produce that depth for over half of the distance, and partly because, where the channel must be cut through rock, that depth will furnish the most economical method of handling the volume of water required on the lower reaches of the waterway. The Sanitary District's water power plans have been carefully made with a view to future waterway construction, and the dams to be built will furnish no obstacles whatever. Two locks will be required. A location has been provided for a lock at the upper dam, giving a lift of about thirty-four feet. For the lower lock a location is set apart on the west side of the river. The locks must be large enough to handle whole fleets of barges and tugs.

The construction of the deep waterway on this section is the most difficult and expensive, mile for mile, that is required on any portion of the route. The total cost is estimated at $8,000,000, of which, as has been said, the Sanitary District is preparing to spend $3,000,000, or about half of the primary cost of cutting the channel proper through the rock. The additional cost is required for the two great locks. An expenditure of $5,000,000 will, it is thought, be ample for the government's share of the work, and it has been frequently suggested that the State of Illinois construct this section by prison labor from the penitentiary at Joliet, through which city the course runs.

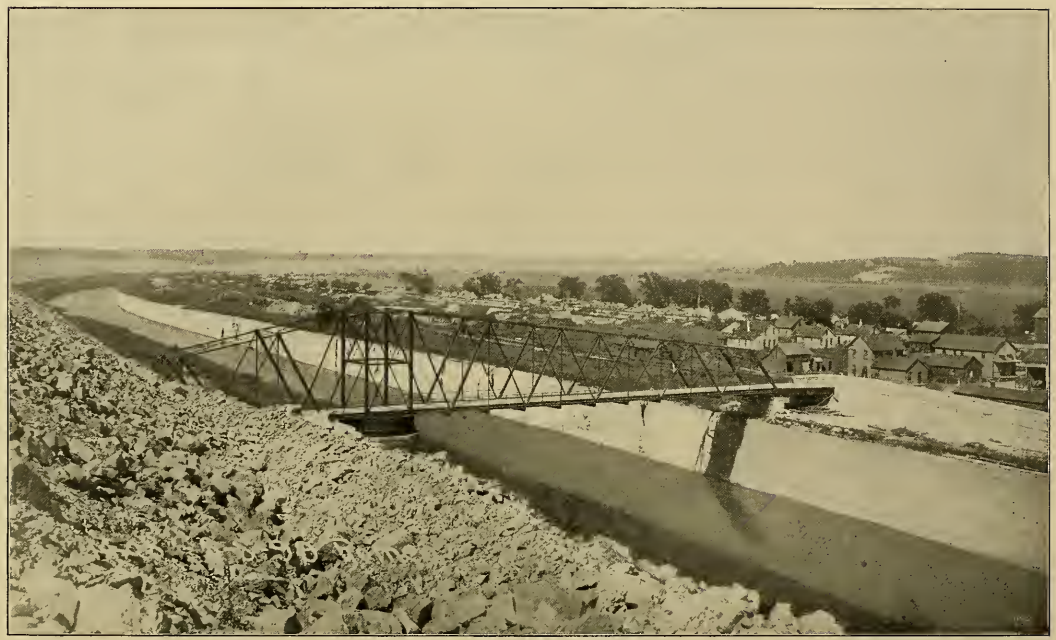
THE UPPER ILLINOIS SECTION—LAKE JOLIET TO UTICA.

The fifty-four miles of the river immediately below Lake Joliet are much more easily handled from an engineering standpoint. The level of Lake Joliet is seventy-six feet below Lake Michigan, and the fall of sixty-six feet from this to the Utica level of 142 feet below the lake is made in a series of pools and rapids, according to the nature of the resisting strata. The three pools—Lake Joliet, Lake Du Page and the pool above Marseilles—cover about one-third of the distance. There is a well defined outlet valley, and a developed stream bed, deeply cut for the greater part of the way. The distance between banks is from 500 to 700 feet. The tributary watershed varies from 6,400 square miles, at the mouth of the Kankakee, to 10,400 square miles at Utica, and gives rise to floods which come in part during the season of navigation. There are no artificial obstructions, except the mill dam at Marseilles, but six highway and three railroad bridges will require alteration.

The studies thus far made indicate the possibility of a proper treatment without injury to any great area of bottom lands. Lake Joliet, at the upper end of this section, is five miles long, and needs nothing but the cutting away of deposits in the shape of narrow gravel bars to insure the proper depth. In the rapids, the considerable declivity and consequent velocity make necessary a large and deep channel in the interests of navigation. Studies thus far made have proceeded for a depth of fourteen feet and a width of 300 feet. Three levels or pools will be necessary, and three dams or locks. A fourteen-foot channel, with locks designed for an ultimate depth of twenty feet, can be secured, it is estimated, for $10,000,000.

THE LOWER ILLINOIS—UTICA TO THE MOUTH OF THE ILLINOIS.

The problem of river improvement changes entirely again after Utica is passed. From that city southward, the Illinois is an alluvial stream with a declivity so small as to be almost unique among American rivers, amounting to only twenty-eight feet in the natural river, and only thirty-two feet from the level of the pool formed by the Henry dam at Utica bridge to the low water line of the Mississippi. The stream bed is from 600 to 900 feet wide, and some 700 square miles of bottom lands are subject to overflow, the situation being complicated by backwater from the Mississippi, which at extreme high water is on a level with



CURVE IN CHANNEL AT ROMEO, ILLINOIS.

natural low water thirty miles below Utica. The banks are low, averaging not more than twelve to fourteen feet above low water. There are four dams and locks, two built by the state at Henry and Copperas Creek, and two by the United States at La Grange and Kampsville on this section.

Experience in dredging the sand bars showed a reasonable permanence in results, even with the smaller volumes of water, before the Chicago Sanitary and Ship Canal was opened, but the volume was not sufficient to maintain a channel more than four to six feet deep. In the last two years, since the sanitary canal was opened, it has been possible to maintain a channel seven feet deep and 200 feet wide, except at the mouth of the Illinois, without great trouble. When the full flow of 10,000 cubic feet a second passes out of the canal, this depth will be increased without further dredging. It is easy to see what a great effect this volume of water will have on the channel, for it is sixteen times greater than that of natural low water at La Salle, and eight times greater than at the mouth of the Illinois. It is a very appreciable quantity, even in comparison with bank-full figures, twelve feet above low water, which official measurements before the opening of the sanitary canal showed to be 18,000 to 22,000 cubic feet per second from Utica to Havana, 30,000 cubic feet at La Grange and 40,000 cubic feet at Kampsville. The average low water flow at the present time may be placed at about 5,000 cubic feet.

The problem, therefore, becomes the creation of an additional depth of seven feet, and this can be secured for the most part by cheap hydraulic dredging. It is estimated that 70,000,000 yards would have to be removed, but for all of it there can be found easy places of deposit on the back channels, sloughs and marshes near the banks, to the benefit of the bottoms. A channel 300 feet wide and fourteen feet deep can be secured, it is believed, at a cost not to exceed $7,000,000. This does not make allowance for the aid which the scouring action of the augmented volume of the stream would give to the project, nor does it take into account economies in methods, which could be introduced on a work undertaken on so large a scale. For the $7,000,000 it is thought that practically 100,000,000 yards instead of 70,000,000 yards could be handled, and the channel could be made larger by just that proportion.

THE MISSISSIPPI RIVER, GRAFTON TO ST. LOUIS.

No detailed studies have been made as yet for this section of the route, but there is no reason to doubt that a fourteen-foot channel could be maintained. Of the thirty-nine miles, with their total fall of twenty-one feet, the first twenty miles to Alton have a fall of only seven feet, and by the establishment of a dam at that city, raising low water perhaps ten feet, the extension of deep water to this point would be comparatively easy.

The next nineteen miles have a fall of fourteen feet, and the situation is complicated by the entrance of the Missouri. If the deepening of the channel should

prove difficult it would still be quite possible to carry deep water navigation to St. Louis harbor by a short canal, and by developing channels behind Chouteau and Cabaret Islands.

A deep waterway over this route could probably be kept open the entire year, for ice is much less of an obstruction to navigation on such a channel than on the Great Lakes. Records kept at Morris, on the upper Illinois, show an ice season of sixty to seventy days, as against 120 to 140 days on the lake routes from Chicago to Buffalo. Possibly in two-thirds of the years ice would offer no obstruction at all to river navigation, while in the other years ice boats would easily keep navigation open.

The total estimate of the cost of all of these improvements from Lockport to St. Louis is $27,000,000, exclusive of what the Sanitary District is to spend. While the estimates given are in some cases very liberal, it is not to be assumed that the total cost will be less than this amount; but it will certainly not greatly exceed it. Moreover, the channel may be put in use for navigation long before the entire amount is spent. The first eight miles from Lockport to Lake Joliet would have to be completed as a whole at the outset. Lower down three locks and dams would also have to be finished to their final capacity before the opening of the deep waterway. The rest of the work could, however, be carried on at leisure afterward, the prism of the river being progressively developed from year to year.

If a depth of twenty feet for the entire way is desired it would be perfectly possible to secure it without excessive additional cost. It would, however, be necessary to enlarge the Chicago Sanitary and Ship Canal, so as to provide at least double the volume of water it is now capable of carrying. The extension of a twenty-foot channel from Lake Joliet to Utica would involve only a fraction of the cost of a fourteen-foot channel, while a twenty-foot depth in the lower Illinois is simply a matter of water supply and dredging. The large volume of water would be here necessary as an insurance against deterioration. The total additional cost which a twenty-foot channel instead of a fourteen-foot channel from Lockport to St. Louis would involve is roughly placed at $60,000,000.

A twenty-foot channel in the Illinois valley is, however, not advocated by your memorialists as an affair of the present, because its full utilization would depend upon the establishment of a similar depth in the lower Mississippi to the Gulf of Mexico. As conditions now stand, the Mississippi offers a fourteen-foot depth below St. Louis, to equal the fourteen feet now urged for the Illinois, for from five to seven months in the average year. An assured minimum of nine to ten feet is promised. The method by which a twenty-foot depth in the lower Mississippi can be secured is not yet clear, though there is no reason to doubt its ultimate possibility.

Summarizing the facts thus far brought out, but leaving for the next section the discussion of the commercial importance of the deep waterway project, your memorialists respectfully urge upon your consideration the following points:

1. The construction of the proposed waterway is thoroughly practicable.

2. It does not involve the cutting of a new channel through rock, but is really the deepening and improving of an existing waterway, and so is consistent with the known policy of Congress.

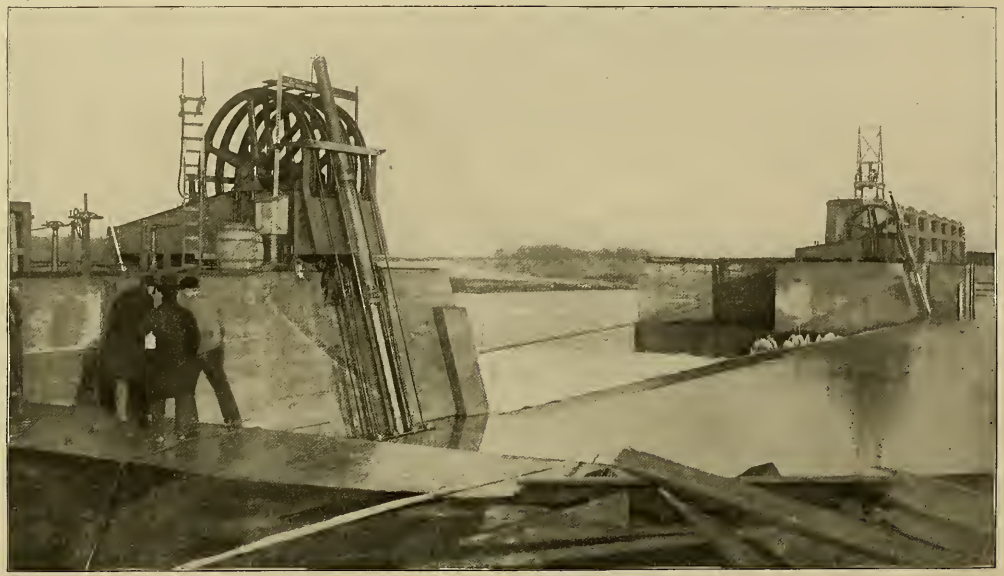
3. The Chicago Sanitary and Ship Canal stands completed and ready for use, as the eastern section of such a waterway.

4. The total cost of developing and making available a channel which in connection with the Sanitary and Ship Canal will furnish a waterway of twenty-two feet depth for the first forty-two miles, and of fourteen feet depth for the rest of the way, will not exceed $22,000,000 to the mouth of the Illinois or $27,000,000 to St. Louis, the larger figure being little more than half of what the Sanitary District of Chicago will alone have spent when its entire work is finished.

5. Besides serving the purposes of navigation, the proposed channel would provide for the flood waters of the Desplaines and Illinois Rivers, and thus prevent the serious injury now done almost yearly to the dwellers along the river valleys.

6. The State of Illinois has by legislation and by joint resolution of its General Assembly, not only formally given approval to the project, but contingently turned the channel over to the Federal Government for navigation purposes, the government control to begin as soon as the full length of the waterway is open.

7. The fourteen-foot minimum depth is suggested as desirable, but without prejudice against any other depths which may prove after fuller surveys to be better.



BEAR-TRAP DAM — UP-STREAM SIDE.

VI.—NATIONAL CHARACTER OF THE PROPOSED DEEP WATERWAY—ITS IMPORTANCE FROM A COMMERCIAL STANDPOINT.

The construction of a deep waterway connecting Lake Michigan and the Mississippi River is an affair of the greatest national importance. To say that it concerns primarily only Chicago and the cities along the route is an error, which no man can continue to maintain after giving the subject even the briefest consideration. If the deepening and improving of the great harbors of the country is a worthy object for the expenditure of national funds, surely the construction of such a waterway is doubly worthy. A harbor facilitates water communication between a particular port and a system of other ports, while a canal such as is proposed opens communication between two great systems of ports now separated from one another by barriers impassable to boats. The harbor of Chicago enables boats to ply between the cities of the Great Lakes and the port of Chicago. The proposed canal would permit boats to ply between all the cities of the Great Lakes, including Chicago, and all the cities of the Mississippi, the Gulf of Mexico, and even of South America. Indeed, the importance of the channel as a connecting link between remote districts reaches even beyond this. Already trading vessels have made repeated trips between European ports and Chicago through the Welland Canal, in which the water is deeper only by a single foot than the depth suggested by your memorialists for the Illinois River; with the opening of the channel a voyage from Liverpool to St. Louis would become a possibility. And looking towards the far east, there would be needed but the opening of the Isthmian Canal to make possible the voyage of a ship loaded with the products of the Mississippi valley from Chicago or St. Louis direct to the Philippines or to China.

It is not necessary, however, to look toward these widest fields of its usefulness for a justification of the construction of the channel. The expenditure of $25,000,000 or $30,000,000 upon it would be easily justified by the commerce between Chicago and St. Louis alone. These two cities are the centers of the commerce of the interior states, and between them the east and west movement of the freight of the country is handled. The live stock and grain of many of the central states find their natural distributing point at St. Louis. Chicago is the nation's center for both the dressed meat and the grain business. It is as well a city in immediate connection by water with the iron ore of the Lake Superior country, the forests of Wisconsin and Michigan, the coal of the eastern states and the manufacturers of a hundred cities. Between Chicago and St. Louis are several cities of large size with no insignificant business. A great and steady water com-

merce between the cities would be assured from the start. The fact that statistics show that river commerce, with which this might at first be compared, is on the steady decline, does not militate against this conclusion. While river commerce and commerce on the old-fashioned canals have been declining, lake commerce in deep draught vessels has wonderfully increased, and it is with lake commerce and not with river commerce that the navigation of the proposed deep waterway can rightly be compared.

Before submitting the statistical figures, which show exactly how great is the commerce of the Great Lakes and of Chicago, and how important a part they are of the commerce of the nation, it is worth while to present the views of two men, widely separated in time and position, but both recognizing the national importance of the proposed deep waterway.

As long ago as 1808 a broad view of the question was taken by Albert Gallatin, Secretary of the Treasury under President Jefferson. In a report to Congress, dated April 6 of that year, in which the subject of canals and highways was exhaustively treated, and the desirability of a connection between Lake Michigan and the Mississippi was specifically mentioned, Secretary Gallatin said:

"Good roads and canals will shorten distances, facilitate commercial and personal intercourse, and unite by a still more intimate community of interest the most remote quarters of the United States. No other single operation within the power of government can more effectually tend to strengthen and perpetuate that union which secures external independence, domestic peace and internal liberty."

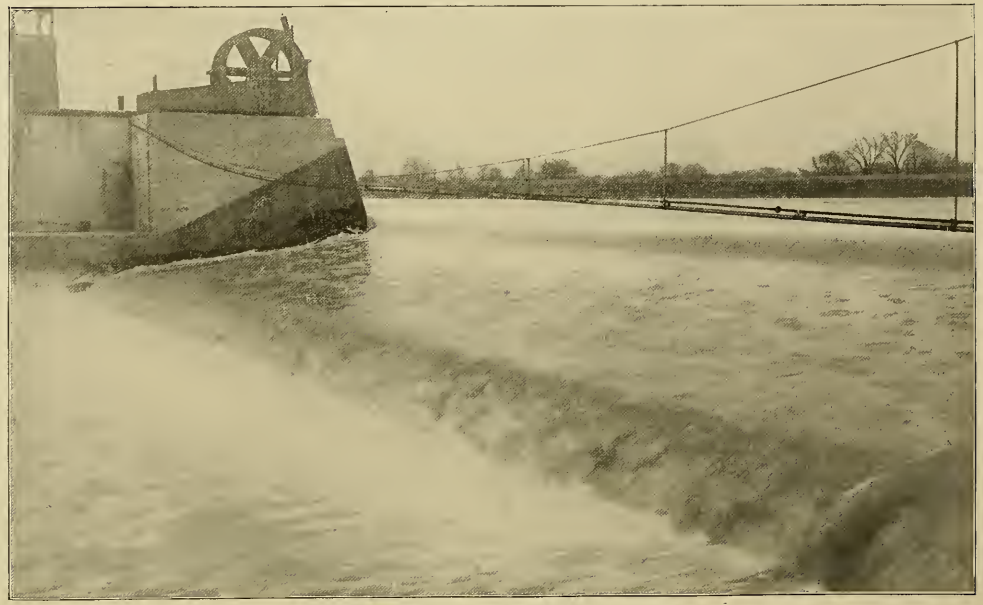
Referring to the desirability of an established canal connection here, he said that, if navigation between the western rivers and the lakes was opened, either from the Mississippi to Lake Michigan, or from the northwest by Lake Superior, the whole Indian trade of those regions would necessarily center in an Atlantic port of the United States. He regarded the commercial phase of the subject as being of minor importance, however, when compared with other advantages of that great communication and the immense weight they would have in its relation to the political intercourse of the United States with the Indians. His estimate of the cost of the improvements necessary to reach the Mississippi River from the lakes was $20,000,000, and to raise that sum he suggested that the government sell 10,000,000 of its 100,000,000 acres of public lands. He believed the increase in the value of the remaining 90,000,000 acres would more than repay the outlay.

Among other men recognizing the national importance of the waterway in the earlier days of the nation may be mentioned John Pope, of Kentucky; Peter B. Porter, of New York; Henry St. George Tucker, of Virginia; John C. Calhoun, of South Carolina; Jesse B. Thomas, of Illinois; Christopher Rankin, of Missouri, and Henry Clay, of Kentucky.

Coming down to recent years, one of the annual reports of Mr. George F. Stone, secretary of the Chicago Board of Trade, has pointed out the importance of the canal to the nation as follows:

"With the growth of our country," Mr. Stone writes, "and a general development of transportation facilities in foreign lands, the project for a navigable connection between Lake Michigan, at Chicago, and the Mississippi River, via the Desplaines and Illinois valleys, assumes an importance in our domestic commerce comparable to that which the Suez Canal or the crossing of the American Isthmus will have in regard to the commerce affected by those great works. Its completion would result in a continuous navigable waterway from the Atlantic, via the St. Lawrence, through the lakes to Chicago, thence to the Mississippi, and thence to New Orleans. Its military and commercial importance might be conclusively demonstrated. It is, I am aware, insisted upon, that we have no need, in these peaceful and enlightened times, to keep in view the liability of war. Certainly, in this age, no permanently aggressive character should be given to our military facilities, but we are not justified in wholly neglecting them, or ignoring a remote possibility of foreign complications. It has been an embarrassment, evident and inevitable to our diplomatic correspondence in momentous crises, that our means of defense have been inadequate, and that the country could not afford to be otherwise than cautiously pronounced in the assertion of her rights. The completion of this great national project would, besides conferring inestimable benefits upon commerce, enable the government to place her gunboats by way of the Mississippi upon the lakes for the protection of immense marine interests. Think you that the existence of such facilities as this waterway from the gulf to the North Atlantic would create, would have no effect upon state discussions of grave issues, when treaty or other rights are threatened or violated? Means of defense are as valuable in times of peace as in war; they tend to prevent war by forcibly suggesting the concession of rights. By the completion of this waterway, the entire system of transportation upon the continent would be straightway affected in the interest of the consumer and producer; the south and the north, the east and the west, would feel its beneficent results. The movement of cotton, grain, coal, timber, iron and merchandise of all kinds would be beyond the power of dictation by transportation monopolies, because countless salutary irresistible restraints would spring into life. It would be a section of an inter-state commerce law which could never be repealed, and the authority of which could never be questioned. It is national in its character, and appeals for its support to every citizen in the land. Its most enthusiastic advocates should not be found here, but in the south and in the east, where are consumed the products of the west, and which, in turn, wish cheap transportation for their manufacturers to sections the yearly resources of which have not been absorbed by excessive freight rates."

The best way to show the immense commercial importance of the Lake Michigan-Illinois River deep waterway is, however, by the presentation of statistics of the commerce upon which it would draw. These statistics should be comprehensive, should show the commerce of the Great Lakes, of the port of



BEAR-TRAP DAM — DOWN-STREAM SIDE.

Chicago and of New Orleans, and should also indicate the business of St. Louis, Peoria and the other interior cities upon the route. Unfortunately such figures are very difficult, indeed, to secure with accuracy, and the United States Treasury Department has only within the last few years begun to gather them in a systematic manner which makes them valuable for purposes of comparison. The tables which follow are, therefore, taken from various sources, and although, having different bases, they are not susceptible to exact comparison, yet they serve to show the immensity of the interests directly involved.

The commerce of the port of Chicago may first be considered. This includes the shipping of both the Chicago and the Calumet Rivers. The latter empties into the lake ten miles further south, and is a stream in better condition for navigation at the present time than the former, which is still hampered by the presence of tunnels, with tops only seventeen or eighteen feet below the surface of the water.

The following table shows the arrivals and clearances in the Chicago River alone since 1883, the source of the figures being a report of a special state commission, and information furnished by the collector of customs for the district of Chicago:

COMMERCE ON THE CHICAGO RIVER, 1883-1901.

YEAR.	ARRIVALS.		CLEARANCES.		TOTALS.		Average Cargo. Tons
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	
1883	11,203	3,555,586	11,271	3,743,574	22,474	7,299,160	325
1884	10,513	3,481,957	10,640	3,489,666	21,153	6,971,623	330
1885	9,846	3,347,647	9,910	3,364,169	19,756	6,711,816	340
1886	10,180	3,564,309	10,267	3,594,549	20,447	7,158,858	350
1887	10,828	3,868,465	10,920	3,989,615	21,748	7,858,080	361
1888	10,158	3,990,921	10,308	4,134,064	20,466	8,124,985	397
1889	9,552	4,417,415	9,462	4,403,634	19,014	8,821,049	464
1890	9,188	4,344,502	9,284	4,429,654	18,472	8,774,156	475
1891	8,956	4,569,526	9,144	4,698 320	18,100	9,267,846	507
1892	9,073	4,798,241	9,252	4,976,216	18,325	9,774,457	533
1893	8,011	4,892,580	8,062	4,914,854	16,073	9,807,434	610
1894	7,318	4,328,685	7,379	4,358,359	14,697	8,687,044	591
1895	7,637	4,602,508	7,687	4,585,831	15,324	9,188,339	600
1896	7,154	4,787,250	7,102	4,719,522	14,256	9,506,772	667
1897	7,619	5,340,648	7,551	5,268,225	15,170	10,608,873	699
1898	7,624	5,285,559	7,763	5,466,321	15,387	10,751,880	699
1899	6,895	4,525,573	6,984	4,582,821	13,879	9,108,394	657
1900	7,181	4,989,118	7,245	4,976,964	14,426	9,966,082	691
1901	6,844	4,648,423	6,822	4.577,116	13,666	9,225,539	675

CANAL, AS SEEN AT WILLOW SPRINGS, LOOKING EAST.

Figures for the port of Chicago, including both rivers, are summarized by the Department of Public Works of Chicago for four decades as follows:

COMMERCE OF PORT OF CHICAGO, 1862-1900, BY DECADES.

PERIOD.	YEARLY AVERAGE TONNAGE.			YEARLY AVERAGE NO. VESSELS.			YEARLY AVERAGE CARGO.		
	Tons.	Increase or Decrease.		No.	Increase or Decrease.		Tons.	Increase or Decrease.	
		Tons.	Per Cent.		No.	Per Cent.		Tons.	Per Cent.
1862 to 1870	4,972,582	.....	....	21,723	.....	.....	229	.....	....
1871 to 1880	6,833,376	+1,860,794	37.4	22,650	+ 927	+ 4.3	302	+ 73	32.0
1881 to 1890	8,702,693	+1,869,317	27.4	23,169	+ 519	+ 2.3	376	+ 74	24.4
1891 to 1900	12,529,628	+3 826,935	44.0	17,881	—5,288	—22.8	709	+333	88.6

The Calumet River has developed very rapidly in late years, and is now carrying a tonnage approaching one-half of the Chicago River's. The combined figures for the two rivers, for the last two years are as follows:

COMMERCE OF PORT OF CHICAGO, 1900-1901.

YEAR.	ARRIVALS.		CLEARANCES.		TOTALS.		Average Cargo. Tons.
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	
1900	8,422	6,945,180	8,554	7,045,714	16,976	13,990,894	824
1901	8,108	6,783,510	8,166	6,851,394	16,274	13,634,904	838

Considering merely the number of vessels that enter and leave its harbor Chicago is the leading port of the country, surpassing even New York, and almost equaling the combined figures of Baltimore, Boston, New Orleans, Philadelphia and San Francisco. This is seen in the following table compiled by the Chicago Department of Public Works, from the report of W. S. Chance, Supervising Special Agent of the Treasury Department, dated June 30, 1901:

COMPARATIVE TABLE OF VESSEL MOVEMENTS.

PORTS.	Entrances.	Clearances.	Total.	Per Cent of Total of Nation.
Baltimore	2,455	3,178	5,633	2.39
Boston	2,888	2,931	5,819	2.36
New Orleans	1,545	1,545	3,090	1.26
Philadelphia	2,038	2,113	4,151	1.68
San Francisco	1,157	1,498	2,655	1.07
Group total	.....	.....	21,348	.....
Chicago	8,464	8,553	17,017	6 91
New York	7,099	6,920	14,019	5 69

The distribution of Chicago's lake commerce between the varied products of the Great Lakes region is shown in the following table, compiled from the summary of commerce and finance, published by the Bureau of Statistics of the Treasury Department, the figures chosen being the latest obtainable:

PRODUCTS HANDLED AT PORT OF CHICAGO.

ARTICLES.	RECEIPTS.		SHIPMENTS.	
	1901.	January to June 1902.	1901.	January to June 1902.
	Tons.	Tons.	Tons.	Tons.
Coal, hard	830,303	107,053	41	.....
Coal, soft	49,090	16,804	39,978	32,708
Flour	3,114	937	165,940	49,931
Iron ore	134,334	8,770	.....	.....
Iron, pig	3,814	361	1,356	275
Iron manufactures	12,824	6,110	4,967	1,963
Salt	200 170	72,726	6,134	3,725
Copper	2,132	850	19,405	15
Unclassified freight	926,789	370,266	479,516	156,379
	Bushels.	Bushels.	Bushels.	Bushels.
Wheat	400	25,000	22,845,939	5,039,447
Corn	89,000	.....	19,172,581	5,824,293
Oats	100	38,000	5,753,268	3,057,888
Barley	250	112,000	255,188	.....
Rye	326,500	.....	81,913	583,802
	Thousand feet.	Thousand feet.	Thousand feet.	Thousand feet.
Logs	478	.....	.....	.....
Lumber	665,700	213,563	4,450	1,376

Widening the examination to the commerce of the Great Lakes, the most comprehensive and accurate table in American statistics of navigation is that furnished by the Bureau of Statistics of the United States Treasury Department for the first six months of 1902. It shows the registered tonnage of vessels arriving and clearing on the lakes for the half year to be over 25,000,000. A summary of the facts shown in this table for a total of 254 ports on the Great Lakes follows:

ARRIVALS AND CLEARANCES FOR JUNE, AND FOR SIX MONTHS ENDING JUNE 30, 1902.

MOVEMENT.	MONTH OF JUNE.						SIX MONTHS ENDING JUNE 30.	
	LIGHT.		LOADED.		TOTALS.			
	Vessels.	Registered Tonnage.	Vessels.	Registered Tonnage.	Vessels.	Registered Tonnage.	Vessels.	Registered. Tonnage.
Arrivals	3,192	3,003,954	7,223	6,874,511	10,415	9,878,465	25,965	24,777,824
Clearances	3 160	2,887,879	7,272	6 924,422	10,432	9,812,301	26,540	25,341,698

In former years the commerce passing through the Detroit River was taken as the practical equivalent of the entire lake traffic, and when an estimate of the growth of lake commerce is sought, it is usually by comparisons on these lines. So great has been the growth of traffic between Lake Superior and Lake Michigan, however, that the Detroit River has lost its position as the index of navigation,

and comparisons based upon it are so unsatisfactory that they are best omitted. The following tables concerning the amount and value of Lake Superior traffic, and the portion of it passing into Lake Michigan, are very suggestive. They are both from the Treasury Department summary for the year 1901.

RESULTS OBTAINED FROM DISCUSSION OF TRAFFIC STATISTICS THROUGH ST. MARY'S FALLS CANAL.

SEASONS.	Total Freight.	Valuation of freight.	Total ton-miles.	Total cost of transportation.	Cost of carrying per ton-mile.	Average distance freight was carried.	Value of American craft.	Value of Canadian Craft.	Proportion of freight carried by Canadian Vessels.
	Net tons.	*Dollars.*		*Dollars.*	*Mills.*	*Miles.*	*Dollars.*	*Dollars.*	*Per cent.*
1887....	5,494,649	79,031,757	4,458,544,804	10,075,153.00	2.3	811.4	17,684,550	2,089,400	7
1888....	6,411,423	82,156,019	5,173,132,972	7,883,077.00	1.5	806.4	20,381,100	1,514,300	6
1889....	7,516,022	83,732,527	5,940,646,352	8,634,247.00	1.5	790.4	25,328,600	1,597,600	4
1890....	9,041,213	102,214 948	7,207,299,415	9,472,315.00	1.3	797.2	27,857,700	1,777,800	3.5
1891....	8,888,759	128,178,208	7,292,462,269	9,849,023 00	1.35	820.4	31,947,300	2,119,500	4
1892....	11,214.333	135,117,267	9,222,773,938	12,072,851.00	1.31	822.4	36,220,100	2,108.700	3.8
1893...	10,796,572	145,436,957	8,980,310,240	9,957,483 00	1.1	831.9	39,017,400	2,115,700	4.1
1894....	13,195,860	143,114,502	10,927,871,324	10,798,310 28	.99	821.1	41,124,200	1,959,800	3 5
1895....	15,062.580	159,575,129	12,502,548,892	14,238,758.02	1.14	830	40,858,800	2,037,000	3.75
1896....	16,239,061	195,146,842	13.582,641,886	13,511,615.80	.99	836.4	43,006,200	2,135.300	4
1897....	18,982,755	218,235,927	15,969,393,576	13,220,099.84	.83	841.3	42,375,700	2,001,400	3
1898....	21,234,664	233,069.740	17,891.597,030	14,125.896.00	.79	842.6	45,199,800	2,491,900	2.2
1899....	25,255,810	281,364,750	20,891,944,628	21,959,707.25	1.05	827.2	65,000,520	3.369,600	3.1
1900....	25,643,073	267,041,959	21,179,229,014	24,953,314.71	1.18	825.9	66,116,583	3,618,576	3
1901....	28,403,065	289,906,865	23.383,861,987	23.217,974.07	.99	823.3	57,244,200	3.311,900	4

FREIGHT TO AND FROM EACH LAKE.

PORTS ON —	From Lake Superior East Bound to—	To Lake Superior West Bound from—
	Net tons.	*Net tons.*
Lake Michigan	2,211,476	91,359
Lake Huron	917,919	187,517
Lake Erie	19,716,465	5,015,636
Lake Ontario	241,882	20,811
Total	23,087,742	5 315,323

Turning to New Orleans, the following figures of arrivals and clearances, compiled from United States customs reports, may be given:

COMMERCE OF THE PORT OF NEW ORLEANS.

MOVEMENT.	SIX MONTHS ENDING JUNE, 1902.					
	Steamships.		Sailing Vessels.		Total Vessels.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
	Number.	*Number.*	*Number.*	*Number.*	*Number.*	*Number.*
Coastwise	178	148	15	18	193	166
Foreign	421	491	35	21	456	512
Total vessel movements	599	639	50	39	649	678

CANAL, AS SEEN AT WILLOW SPRINGS, LOOKING WEST.

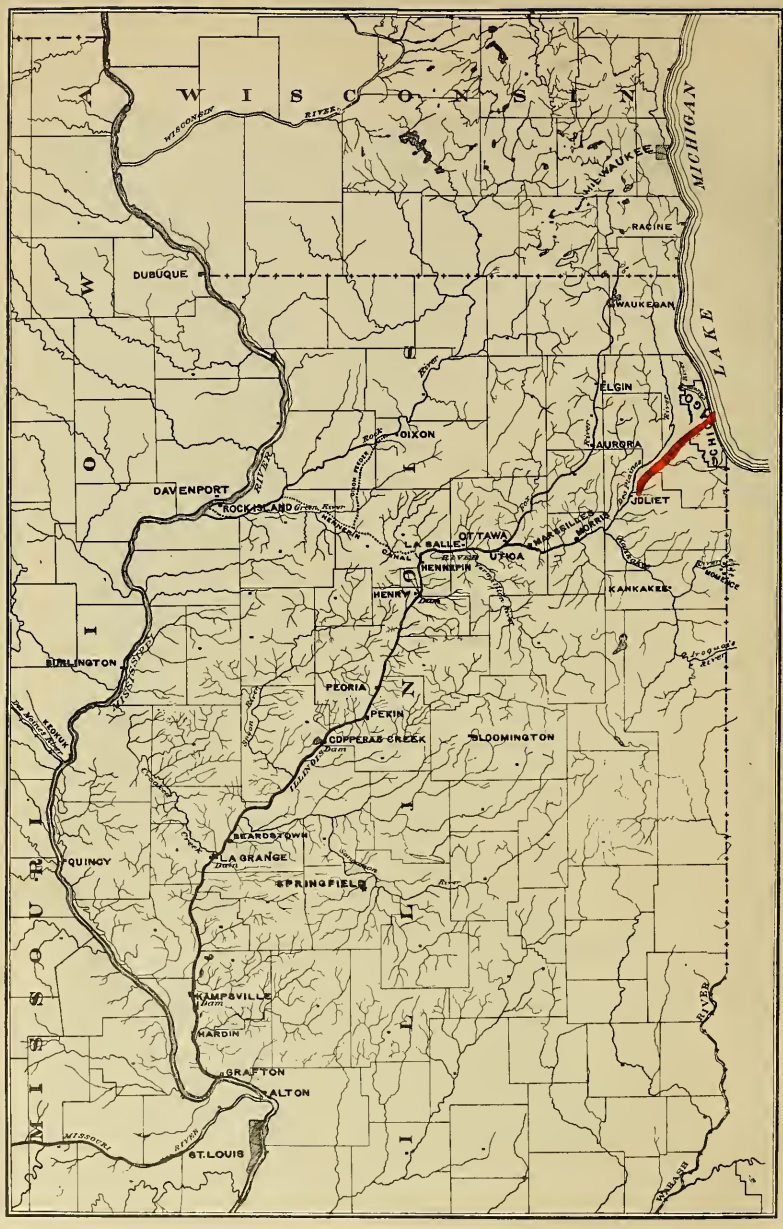
Your memorialists have attempted to show you the commercial reasons for the construction of a deep waterway through the Illinois valley by the Federal Government, but there are other reasons, and equally important ones for the work. Some of these have indeed been suggested in the quoted views of officials favoring the project. They need only mention to commend themselves. Every new agency for better communication between different parts of the nation becomes also an agency for knitting the people of the nation into a closer and more cohesive whole. However strongly knit together our states and territories are, however universal and sincere the common patriotism of our people, an agency that makes for still closer ties is not to be ignored. The usefulness of such a channel as is proposed in providing an independent entrance to the Great Lakes for light draught war vessels of the government, is only a special case suited to the time of war of the usefulness which endures through the longer, and it is to be hoped never to be broken, periods of peace.

Your memorialists leave the consideration of this great work of internal improvement in your care, trusting that your decision will be favorable and your action comprehensive, and hoping in addition only that it may be prompt, in order that the certain benefits may early be possessed.

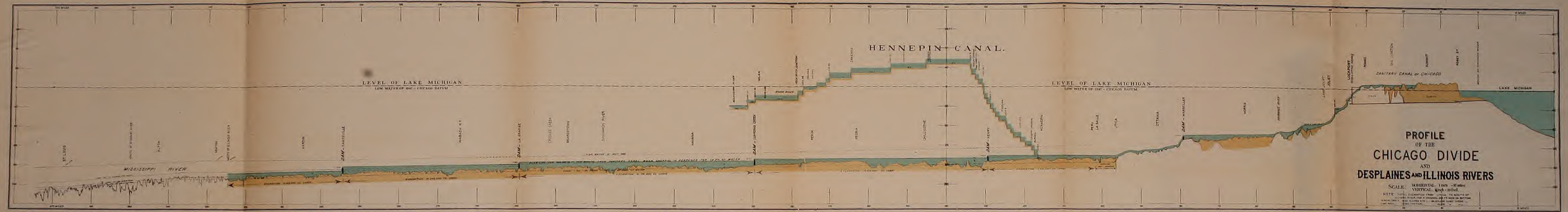
Your memorialists have the honor to subscribe themselves:

WILLIAM H. BAKER,
JOSEPH C. BRADEN,
ZINA R. CARTER,
FRANK X. CLOIDT,
ALEXANDER J. JONES,
WILLIAM LEGNER,
THOMAS A. SMYTH,
THOMAS J. WEBB,
FRANK WENTER,

Members of the Board of Trustees of the Sanitary District of Chicago.



THE WATERWAYS OF ILLINOIS.


HENNEPIN CANAL.
LEVEL OF LAKE MICHIGAN
LOW WATER OF 1847 – CHICAGO DATUM
LEVEL OF LAKE MICHIGAN
LOW WATER OF 1847 – CHICAGO DATUM
MISSISSIPPI RIVER
ST. LOUIS
ALTON
HENNEPIN
PEORIA
OTTAWA
LA SALLE
JOLIET
SUMMIT
LAKE MICHIGAN
SANITARY CANAL OF CHICAGO
PROFILE
OF THE
CHICAGO DIVIDE
AND
DESPLAINES AND ILLINOIS RIVERS
SCALE: HORIZONTAL 1 inch = 10 miles
VERTICAL 1 inch = 20 feet.

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